Sustainability, Encroachment, and Room to Maneuver

- Part of Fort Future - a system for evaluating alternative plans for transforming installations

- Part of the Land Management Suite

SERDP Coordination Briefings

- SERDP, JLUS, OSD, Services – June 2000
- ARSIC – July 2000
- EPIC (SELC Planning Group) – July, Aug 01
- Warfighter Technical Council (Ft. Future, Aug 01)
- Ft. Benning Garrison Commander - Nov, 01
- MG Van Antwerp & LTG Riggs - Jan, 02
- AEC, ODEP, CAA – Feb 02
- HQ Air Force Civil Engineer and I&E (Coats) – Feb 02
- DOD IG – Feb 02
- USGS, EPA, USACE SAD – March 02
- I&E (Fiori), USACE HQ (Van Winkle), DoD I&E (Grone) – April 02
- AEC, AEPI, ERDC Workshop – April 02
- FORSCOM Commander – May 02
- Georgia Military Garrison Commanders – Jun 02
- ODEP, AEC , BRAC – August 02
- I&E (Fatz/Vallone) – Sep 02
- SERDP TTAWG, SAB – October 02
- Mr. Woodley – November 02

Installation Modeling and Simulation for Army Transformation

SAME Commander's Briefing – Rock Island Post

November 14, 2002

US Army Corps of Engineers

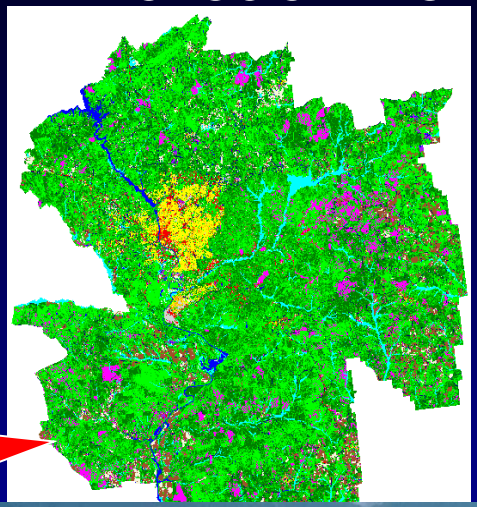
Engineer Research & Development Center

Installation Mission Assurance

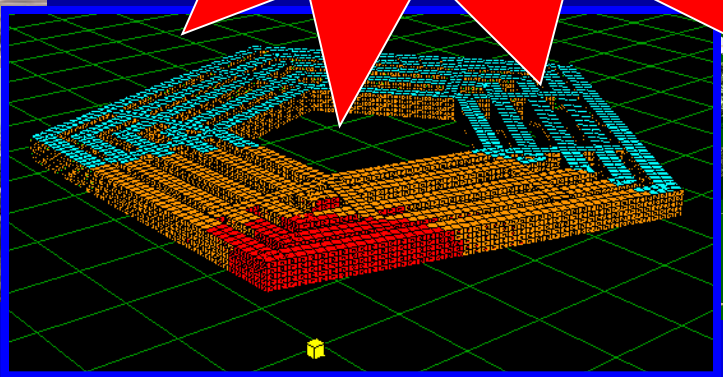
Sustainable Ranges

Encroachment

Force Projecti



What if ?!



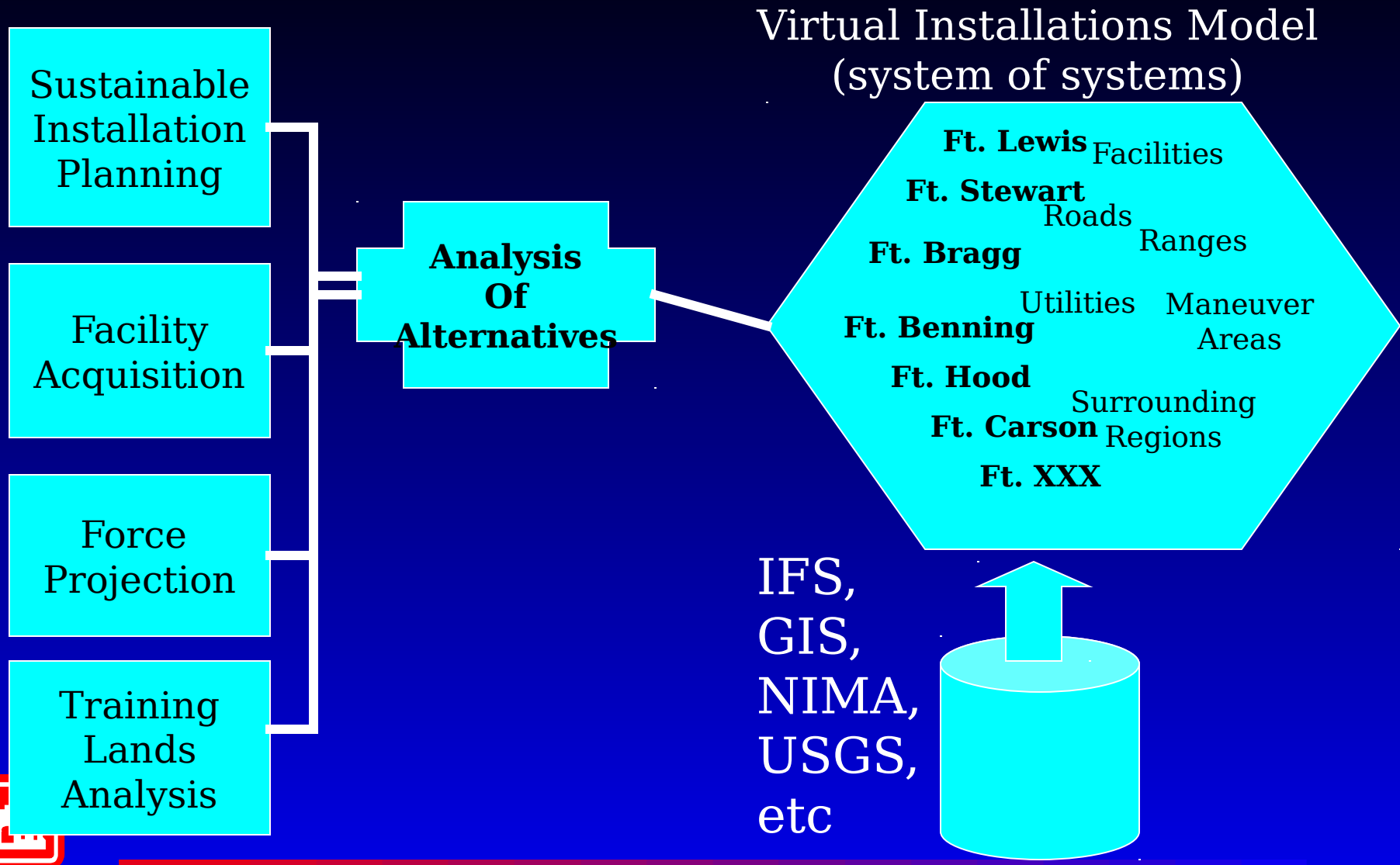
Facility Acquisiti

Force Protection

US Army Corps of Engineers

Engineer Research & Development Center

System Architecture



Problem

- External pressures (encroachment) are impacting the military services' ability to maintain force readiness.
- Encroachment is defined as:

"Any outside activity, law, or pressure that affects the ability of military forces to train to doc… missio…

Objective

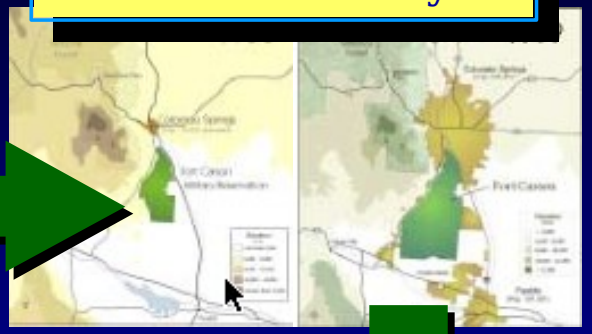
To develop technical capabilities and expertise to

- Understand, predict, visualize, communicate regional and across-the-fence line dynamics for DoD facilities, installations, waterways and areas of interest.
- Relate these trends and actions to the sustainable futures of military installations, waterways and other Army/DOD missions.
- Facilitate the multi-party evaluations of alternative courses of action that help sustain DoD mission capability and support national goals.

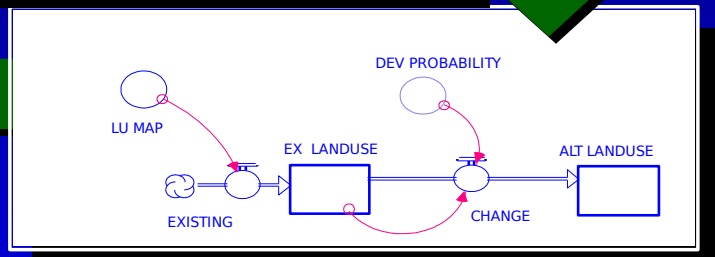
SERM Approach

Assess and compare risks

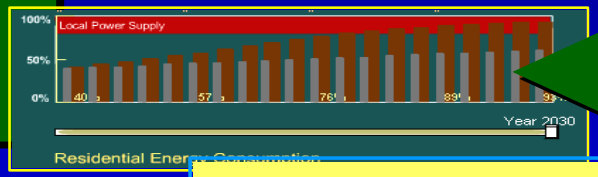
Conduct Trend Analyses



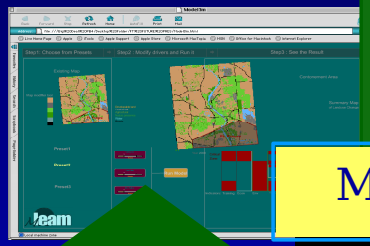
Project Future Changes



Identify Mission Impacts



Mitigate Problems



US Army Corps of Engineers

Engineer Research & Development Center

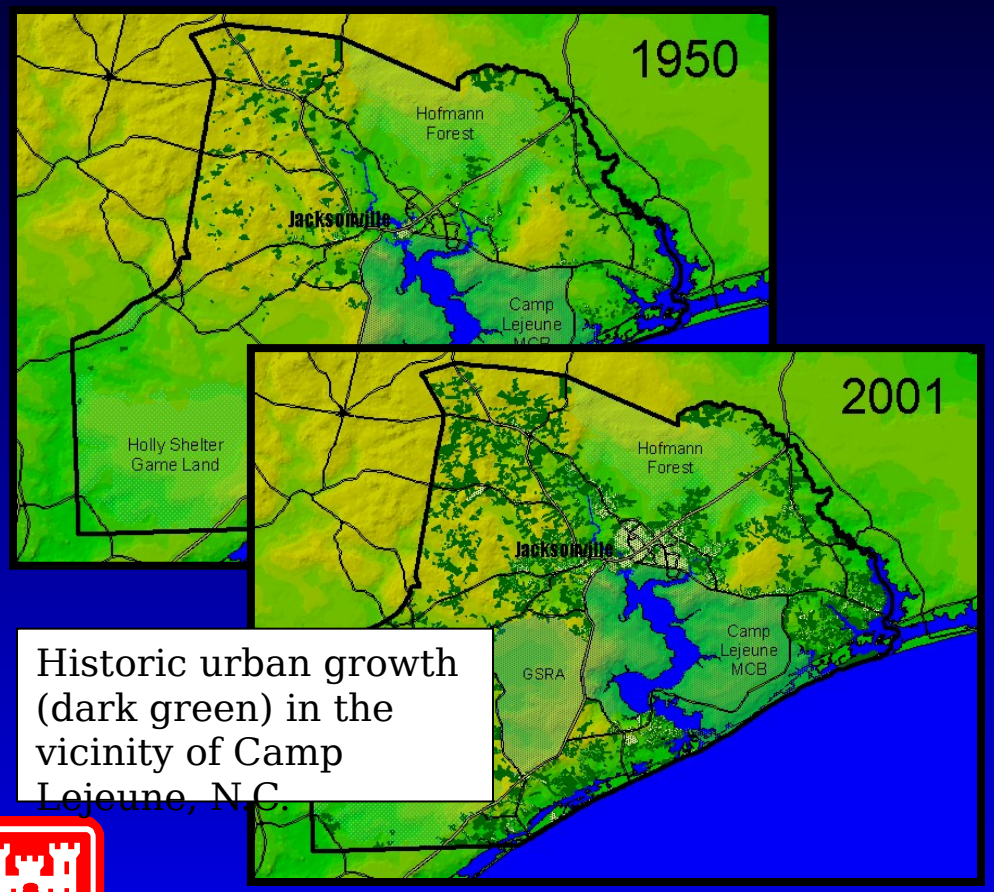
Assess and Compare Risks

- encroachment and environmental risks
- 43 categories
  - applied to 2002 Army stationing strategy
  - for inclusion in Center for Army Analysis - OSAF Model
  - 19 installations studied
- other services evaluating approach and prioritizing requirements

Stressors	Indicators	Fort Carson		Fort Benning		Fort Riley	
		Value	Risk	Value	Risk	Value	Risk
Issue: Air Quality							
Emission Status	Non-attainment area	N	0	N	0	N	0
Issue: Urban Development							
Community Size	State Degree of Population Urbanization	84%	0	69%	2	56%	2
	State Degree MSA Land	18%	0	22%	2	7%	0
	Regional Population Density	313	4	149	2	43	0
	Regional Degree of Land Urbanization	5.60%	4	2.10%	2	1.10%	0
Community Economic Strength	Regional Population Growth	20.80%	4	4.40%	2	-17%	0
	Earnings Per Capita Growth	40%	4	37%	4	34%	2
	Increasing Regional Population Growth Rate	Y	2	Y	2	N	0
	Urban Development Growth	19%	0	57%	4	11%	0
Community Proximity	Contiguous Metro Area	500k	4	272k	2	65k	0
Issue: Social and Economic							
DoD Impact	Military Employment Change	-5172	2	-4590	2	-6960	2
	Military Employment Ratio	9.41%	2	20.60%	0	40.55%	0
	Gov't Employee Density	0.18	0	0.11	0	0.1	0
Issue: Natural and Cultural Resources							
Natural Resource Context	Integrated Natural Resrouces Management Plan (INRMP)	Y	0	Y	0	Y	0
	Endangered Species Manageme Plan (ESMP)	N	0	Y	4	N	0
	Jeopardy Biological Opinions	N	0	N	0	N	0
	Training Land Restrictions	Y	4	N	0	N	0
	Regional T&E Issues	Y	4	Y	4	Y	2
Cultural Resource Context	Integrated Cultural Resources Management Plan (ICRMP)	Y	0	N	2	N	2
	Planning Level Surveys	Y	0	Y	0	Y	0
Issue: Water							
Watershed Withdrawals	Regional Water Fresh Water Consumption Growth	19%	2	38%	4	-4%	0
	Regional Ground Water Percent Total Withdrawals	13%	2	10%	0	28%	4
	Domestic Water Percent of Total Withdrawals	7%	4	26%	2	42%	0
Watershed Health	Index of Watershed Indicators	1	0	3	2	5	4
	Impaired Waters	N	0	Y	2	Y	2
Issue: Noise							
External Impact	Noise Impact Factor	1.5	4	5	0	1.5	4
RISK TOTAL			**46**		**44**		**24**

US Army Corps of Engineers

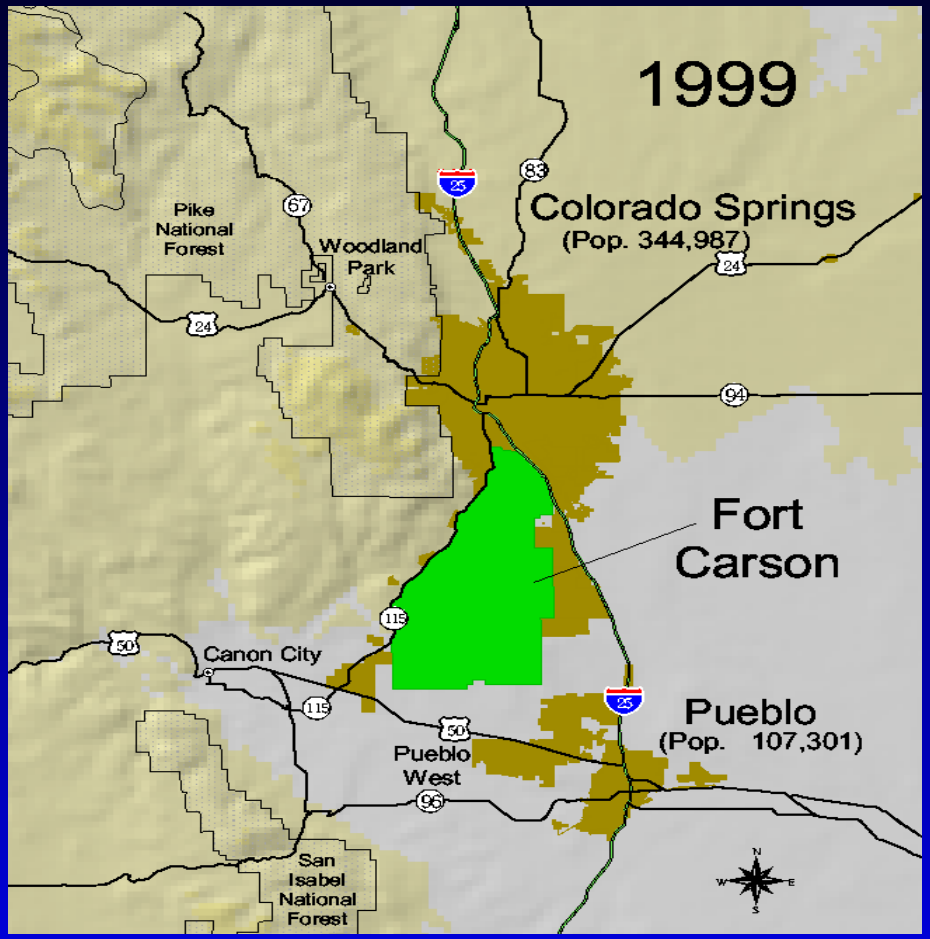
Conduct Trend Analyses



Historic urban growth (dark green) in the vicinity of Camp Lejeune, N.C.

- Trends are drawn from the analysis of:
  - historic land use
  - land cover
  - satellite imagery
- Results are presented in images and video

Changing Land Use Trends Around Ft. Carson, Colorado

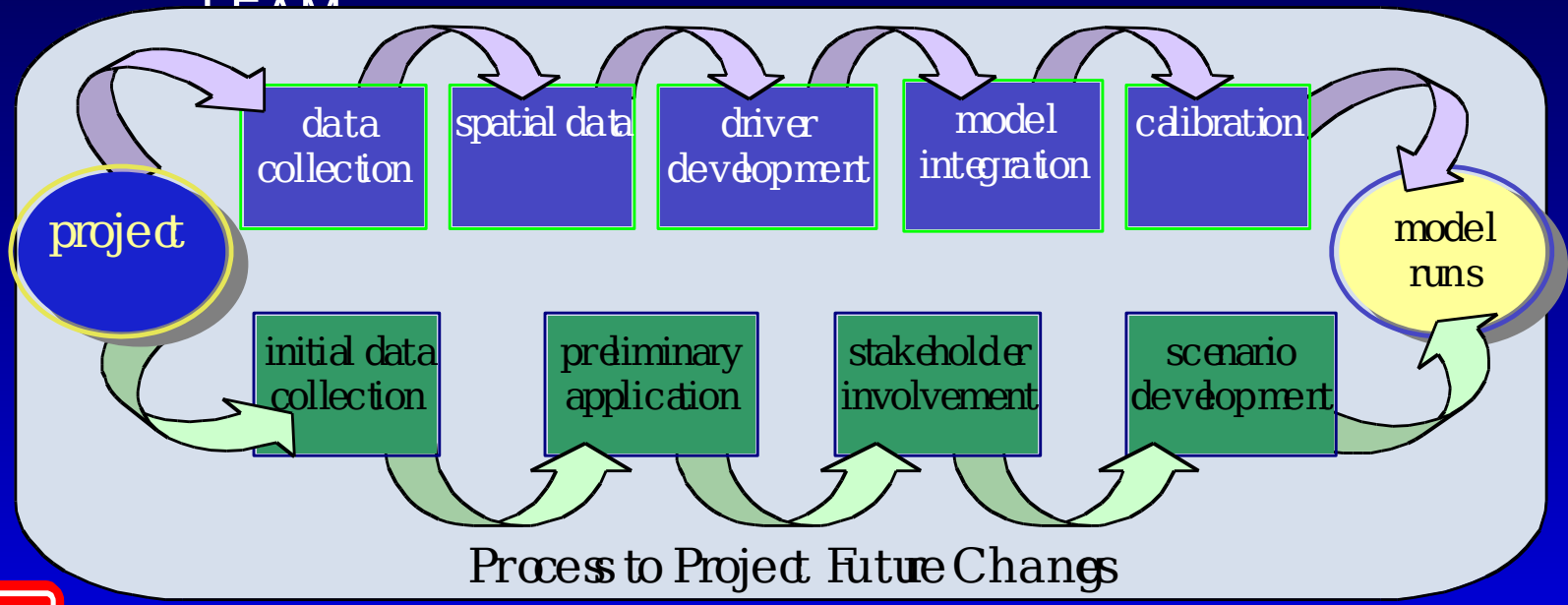


US Army Corps of Engineers

Engineer Research & Development Center

Project Future Changes

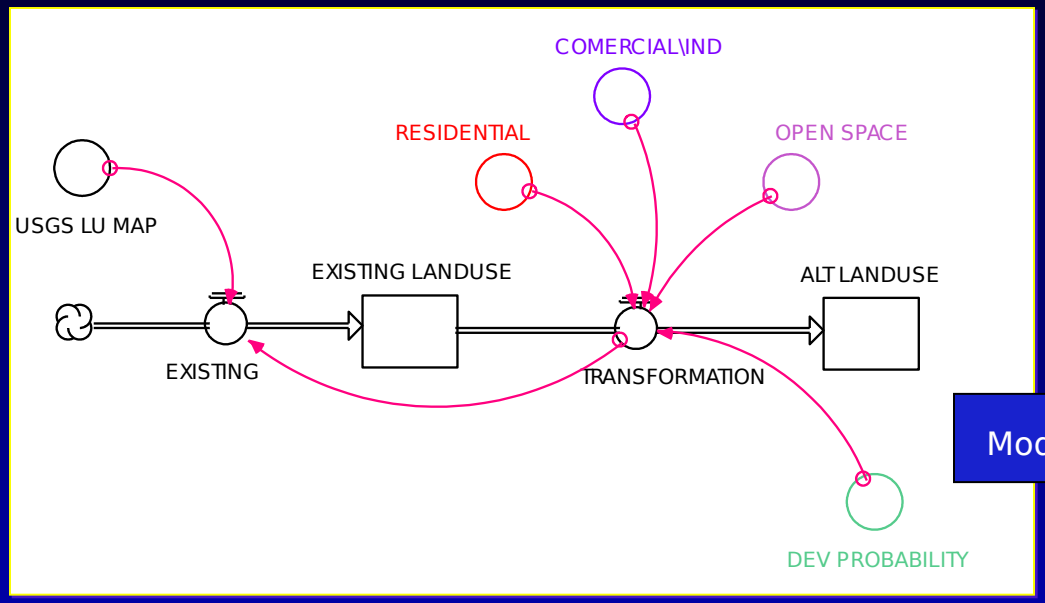
- Create and run raster-GIS based land use change simulation models
  - Land use Evolution and impact Assessment Model - LEAM



Process to Project Future Changes

land use drivers

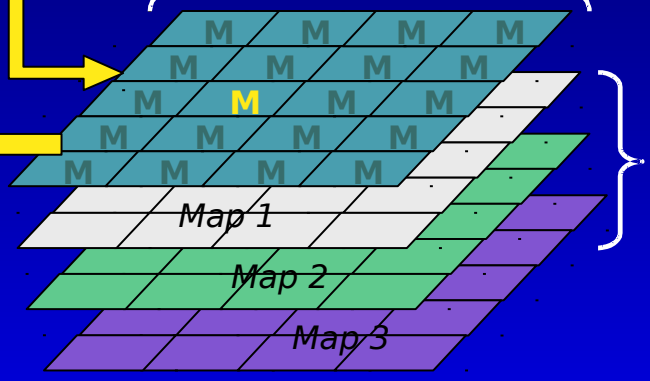
conceptual framework



what if ?

Model Drivers

SME



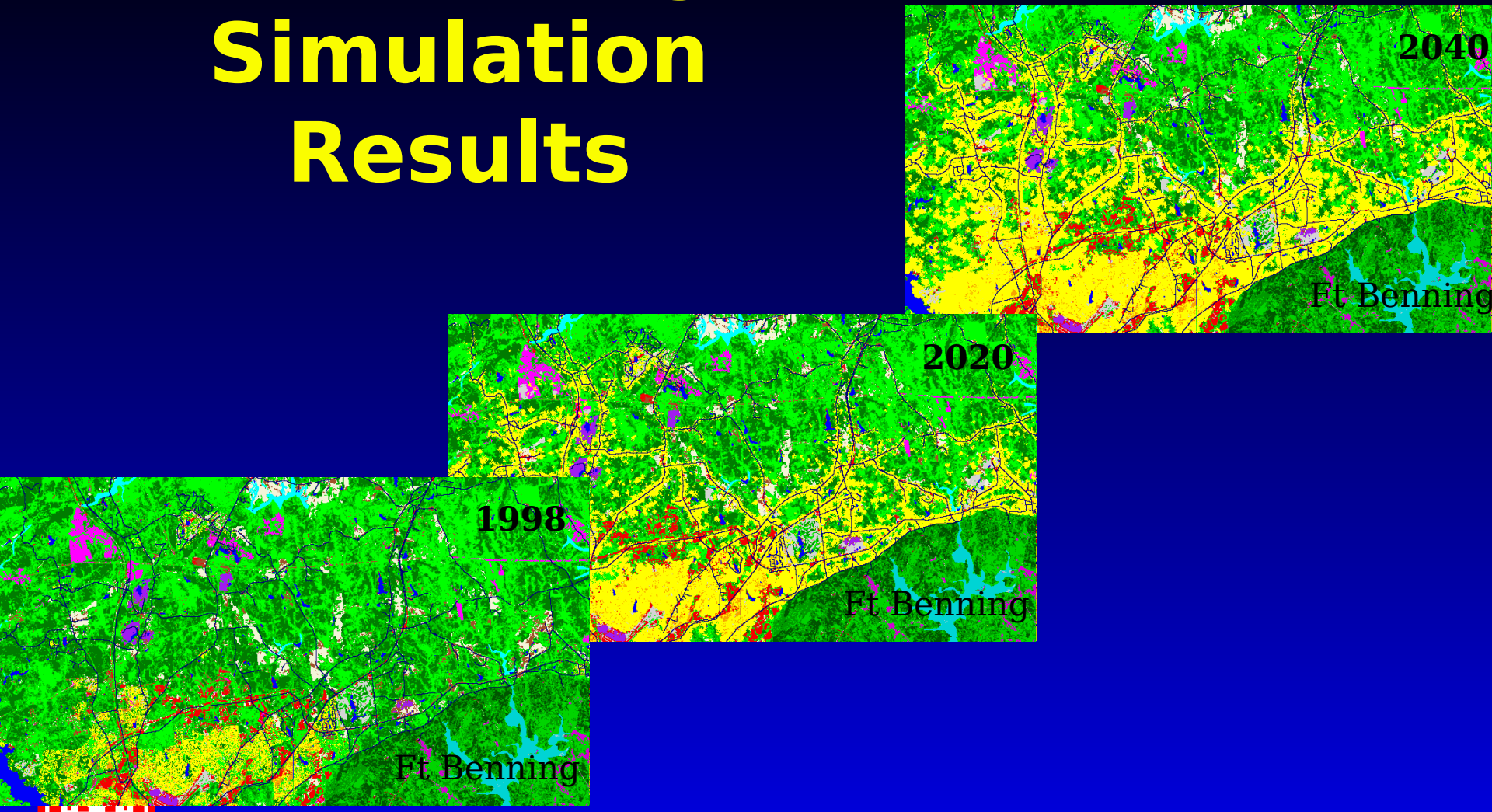
GIS Maps

Impact Assessment

US Army Corps of Engineers

Engineer Research & Development Center

Ft Benning Simulation Results

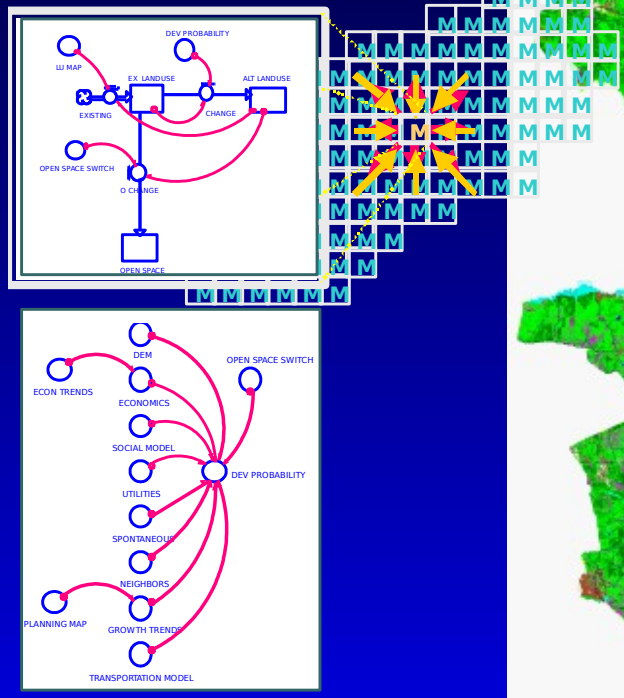


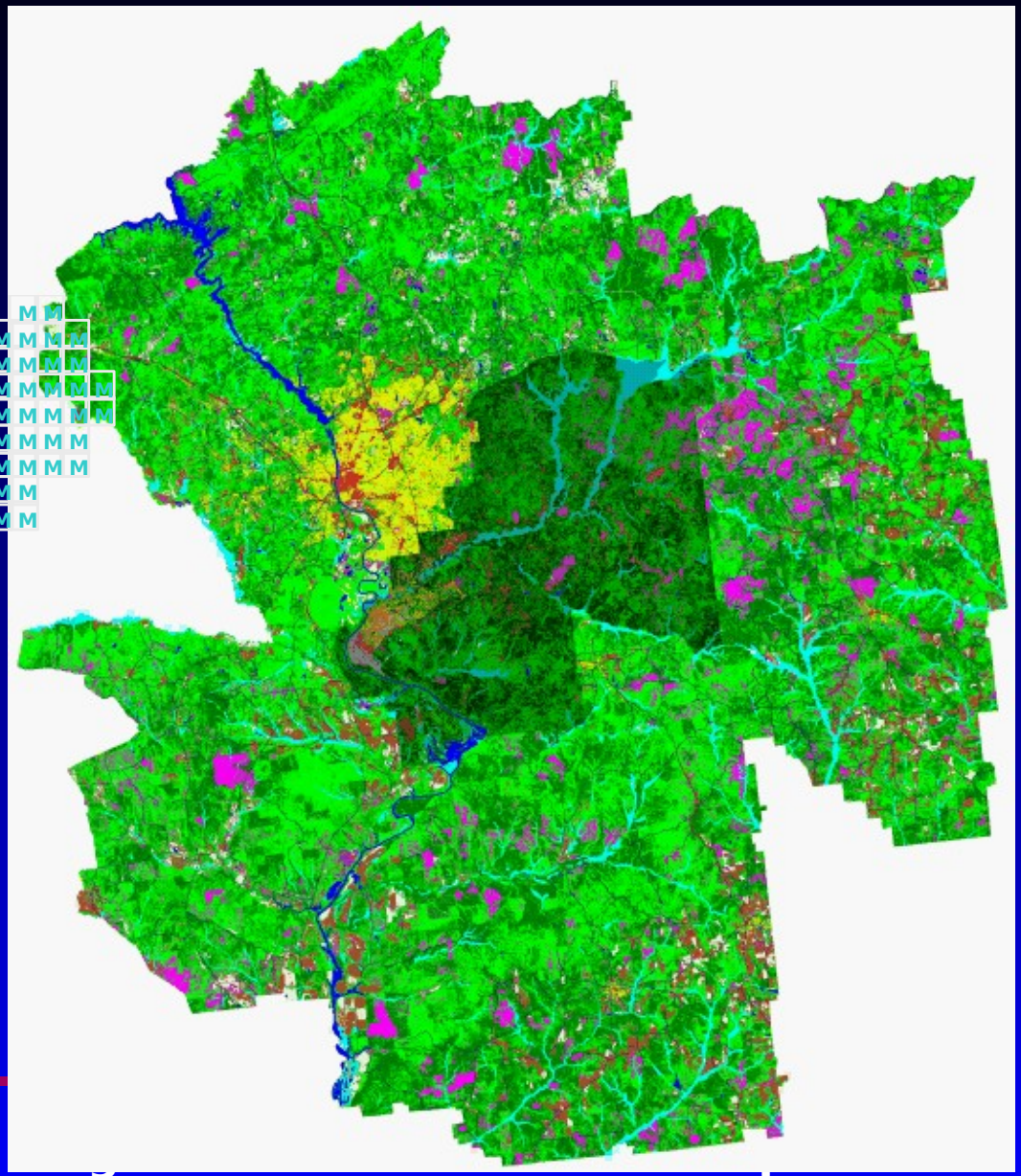
US Army Corps of Engineers

Engineer Research & Development Center

current model

Columbus/Ft Benning
8m cells

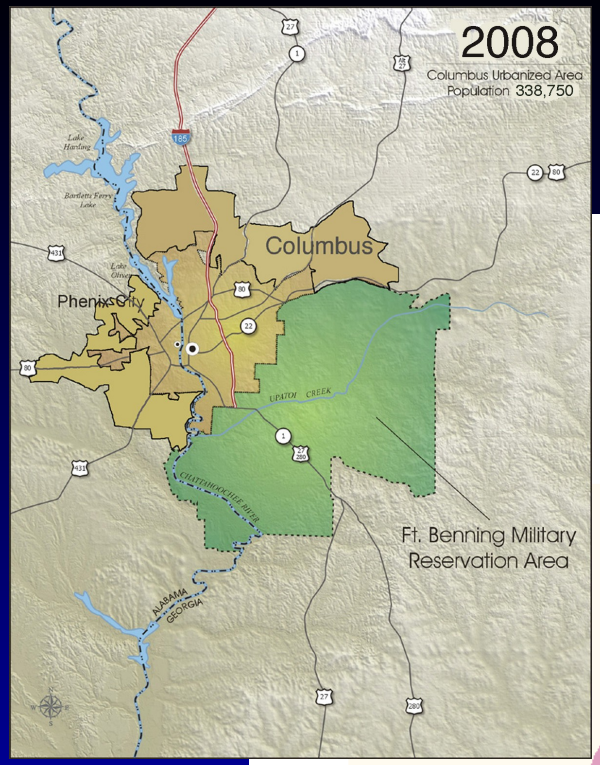




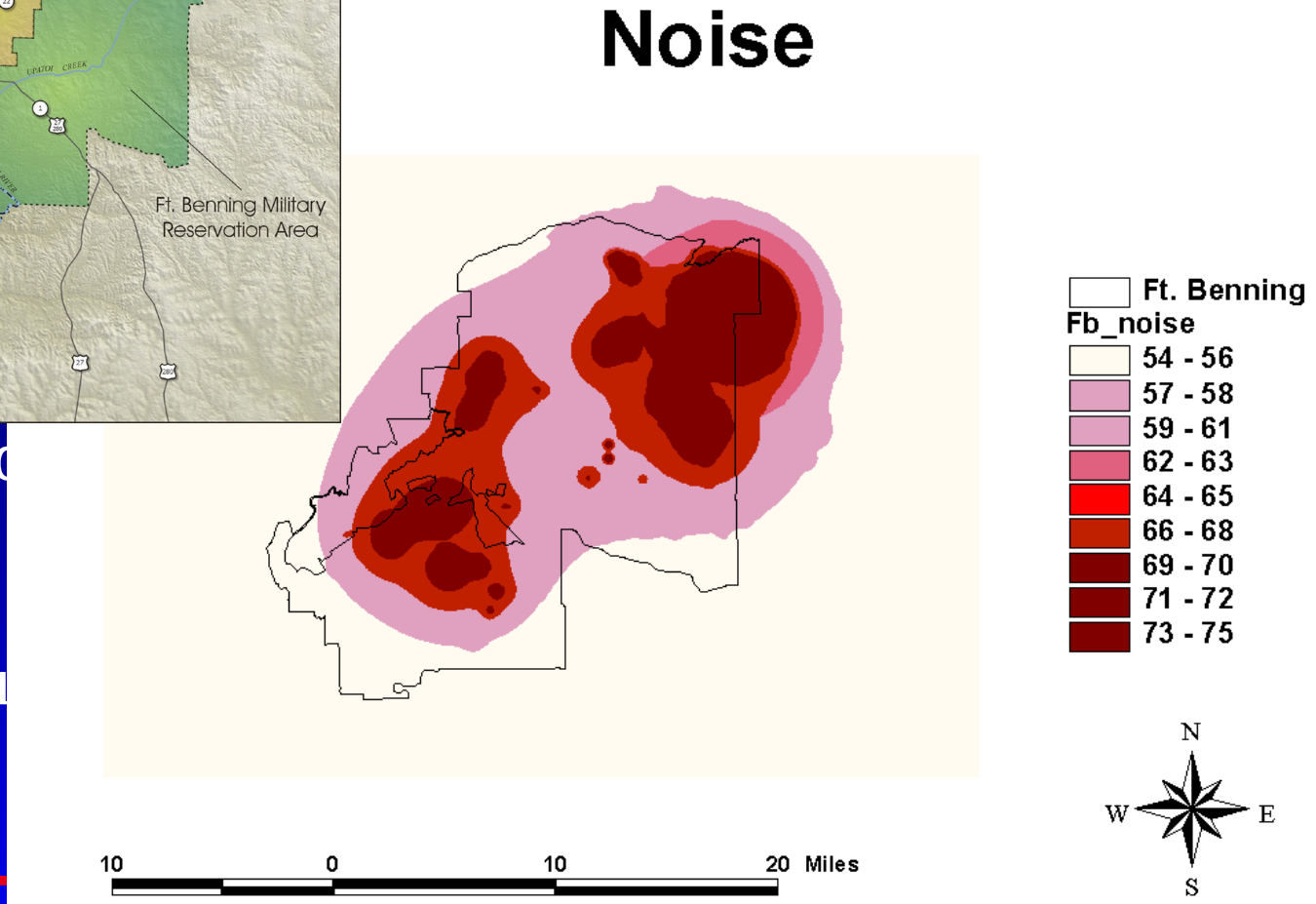
US Army Corps
of Engineers

Center

Noise Contours from Multi-Purpose Range Complex, Ft.



Projected Growth For Columbu

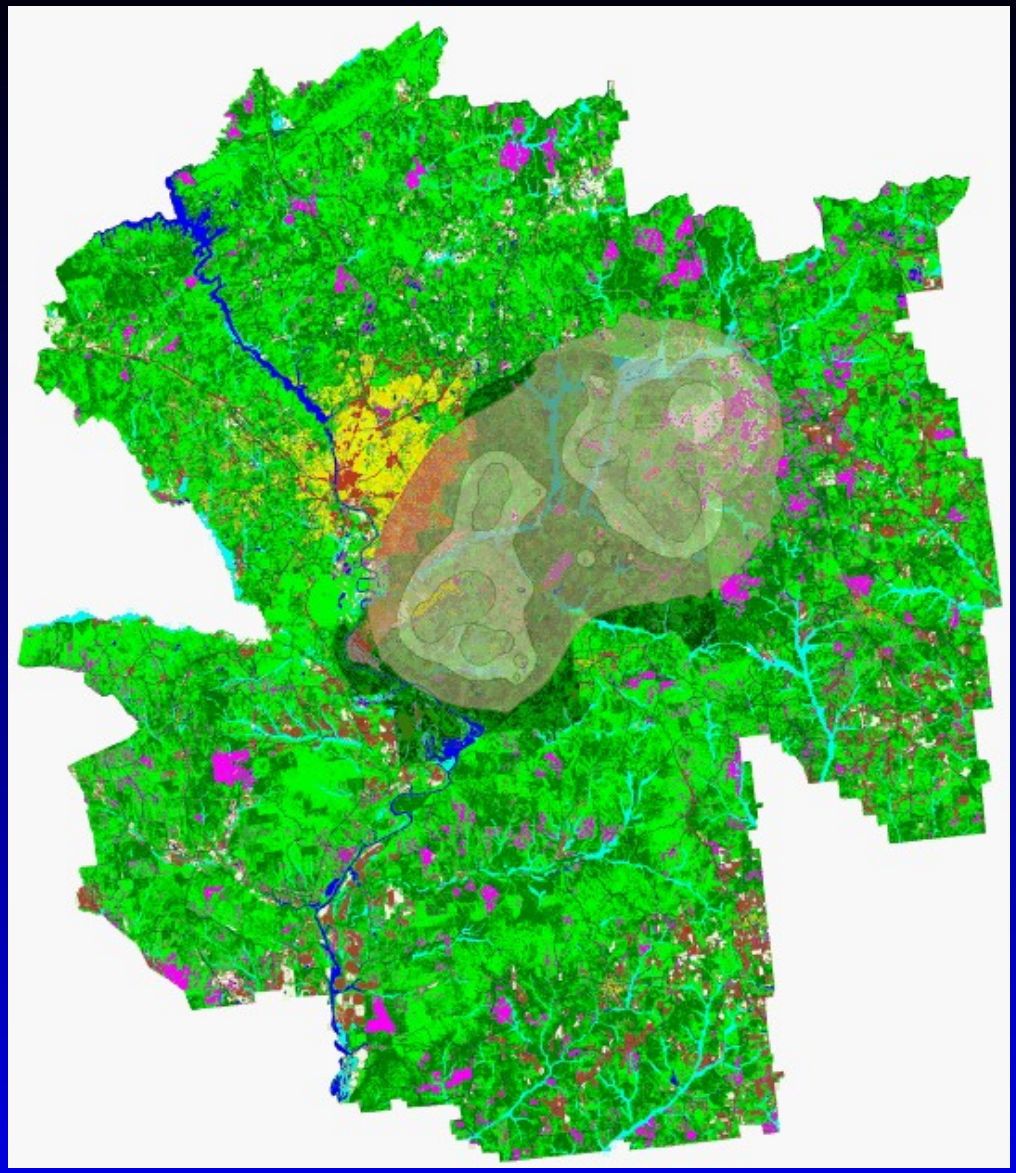


US Army Co
of Engineers

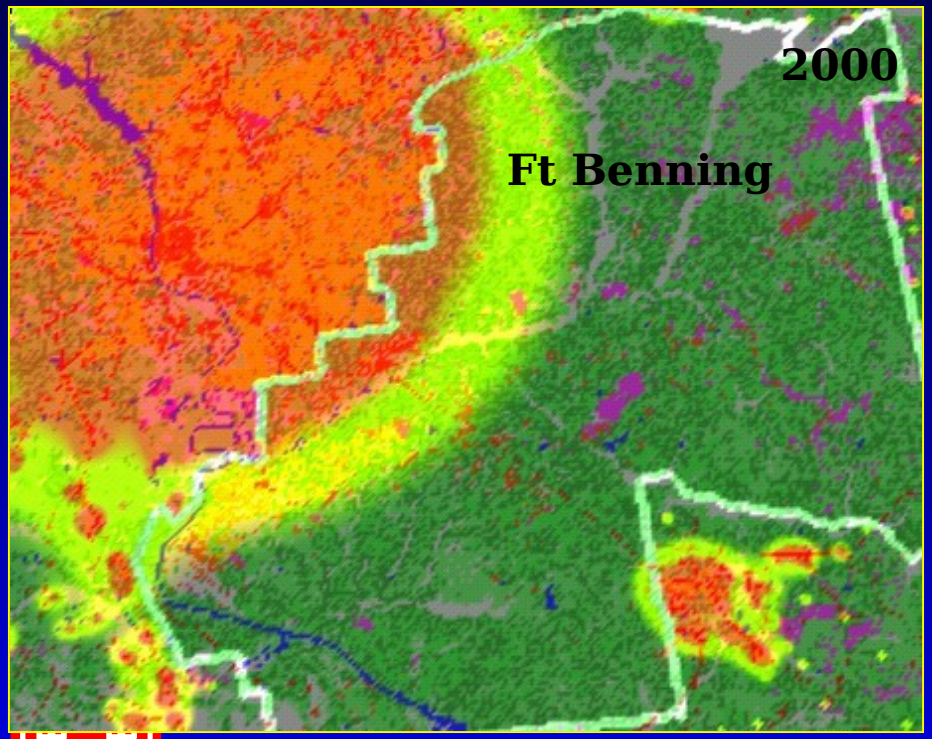
Center

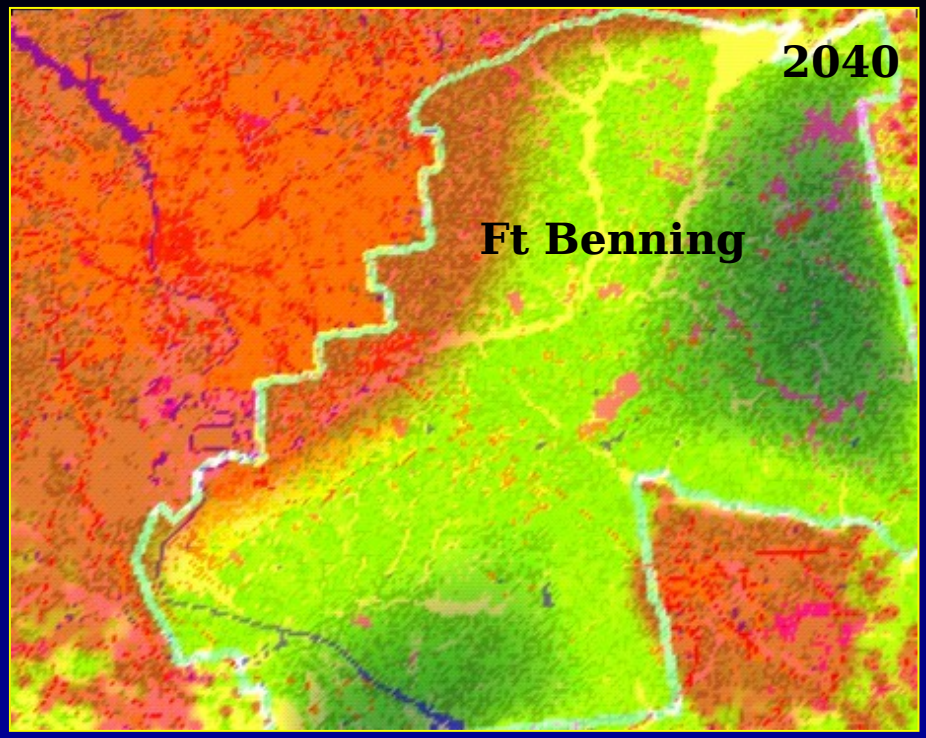
Identify Impacts on Training and Testing

- Impact on current/planned training
  - Noise vs Community Growth



Identify Impacts on Training and Testing





- Loss of future training opportunities due to possible noise related conflicts

Identify Impacts on Training/Testing

- Encroachment issues involve:
  - Habitat (TES) fragmentation and condition
  - Dust, smokes, and obscurants
  - Radio and television frequency
  - Air space and airfield operations
  - Blast and small arms noise
  - Community interaction
  - City and aircraft lights

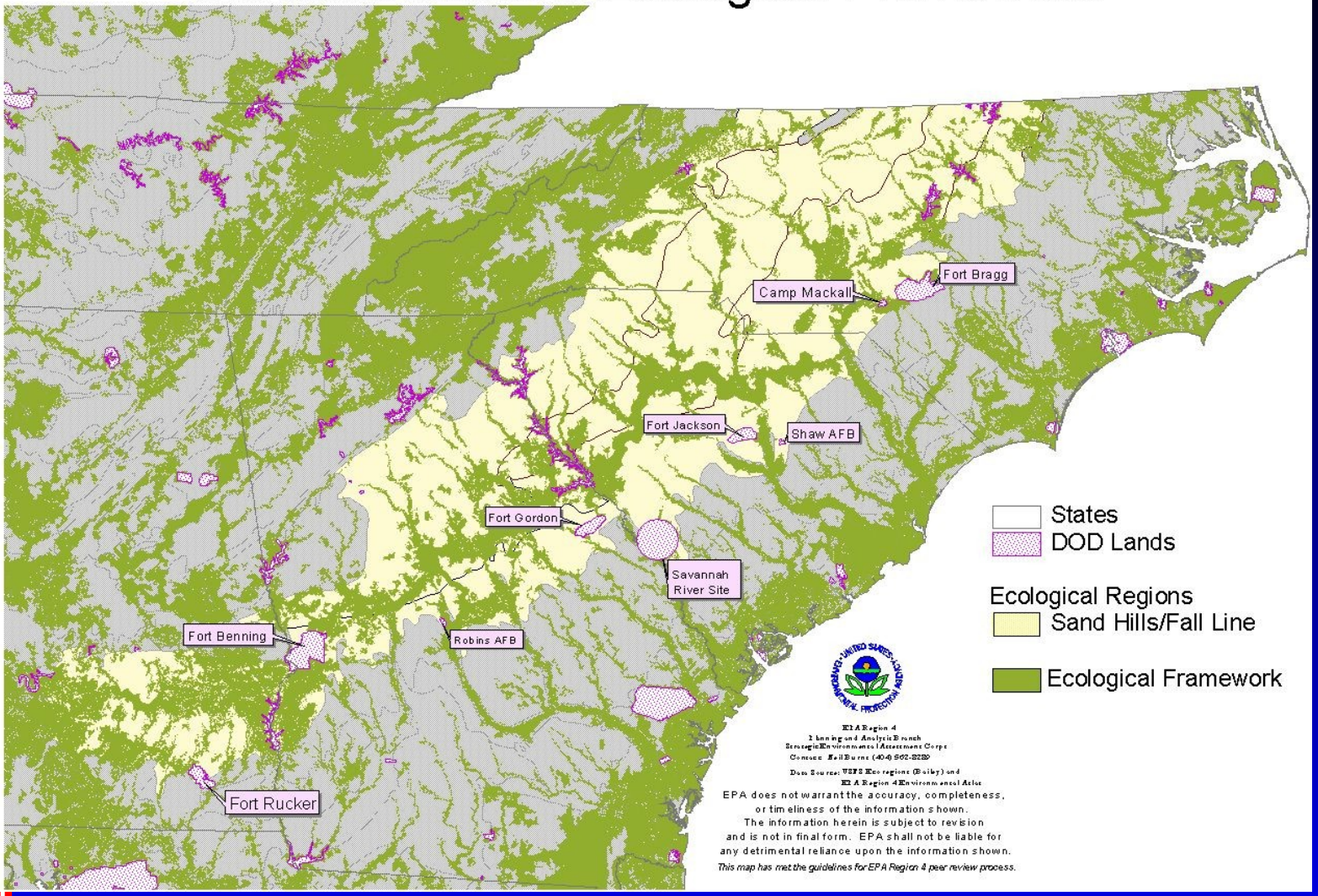
Develop Mitigation Plans

- At the multiple-decade scale, long-term mitigation options can include a number of options including:
  - Changes in property right ownership
  - Development of parks, wildlife areas, forests
  - Coordinated Location of highways and access points
  - Coordinated development of utility grids
  - Usage partnerships on specific parcels
  - Land easements

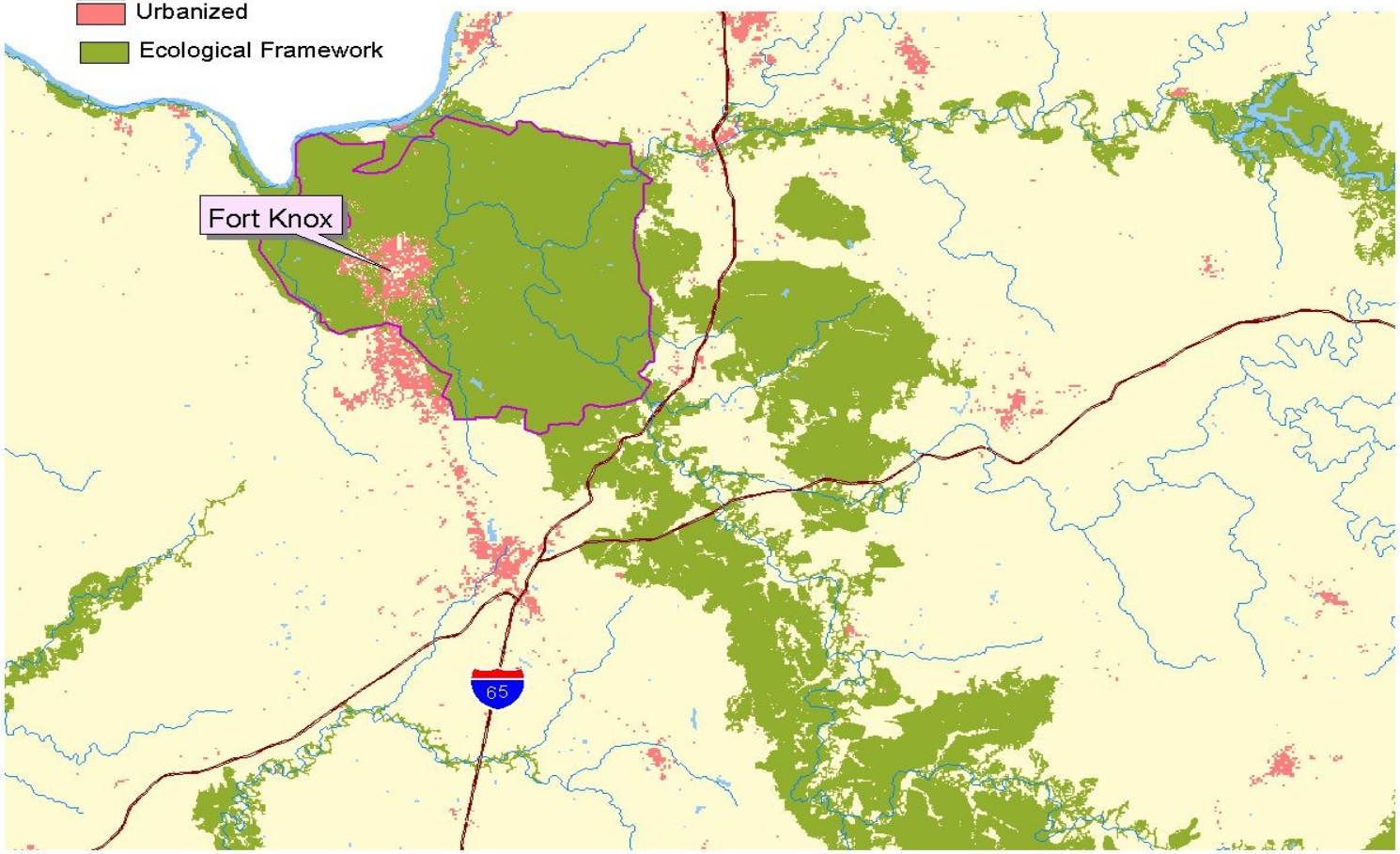
Varying Land Requirements

- Buffer Requirements (ranges, maneuver areas, airfields, cantonment)
- Habitat Requirements (protected species)
- Transportation Requirements (for force projection, access to/from installation)
- Service and Maintenance Requirements
- Proximity Constrained. Vicinity of activity scope.
- Landscape Type Constrained (not necessary adjacent for all species). Ecoregional scope.
- Node and Network Constrained. (Scope varies with transportation mode and point of embarkation).
- Communities as providers (scope varies by service type)

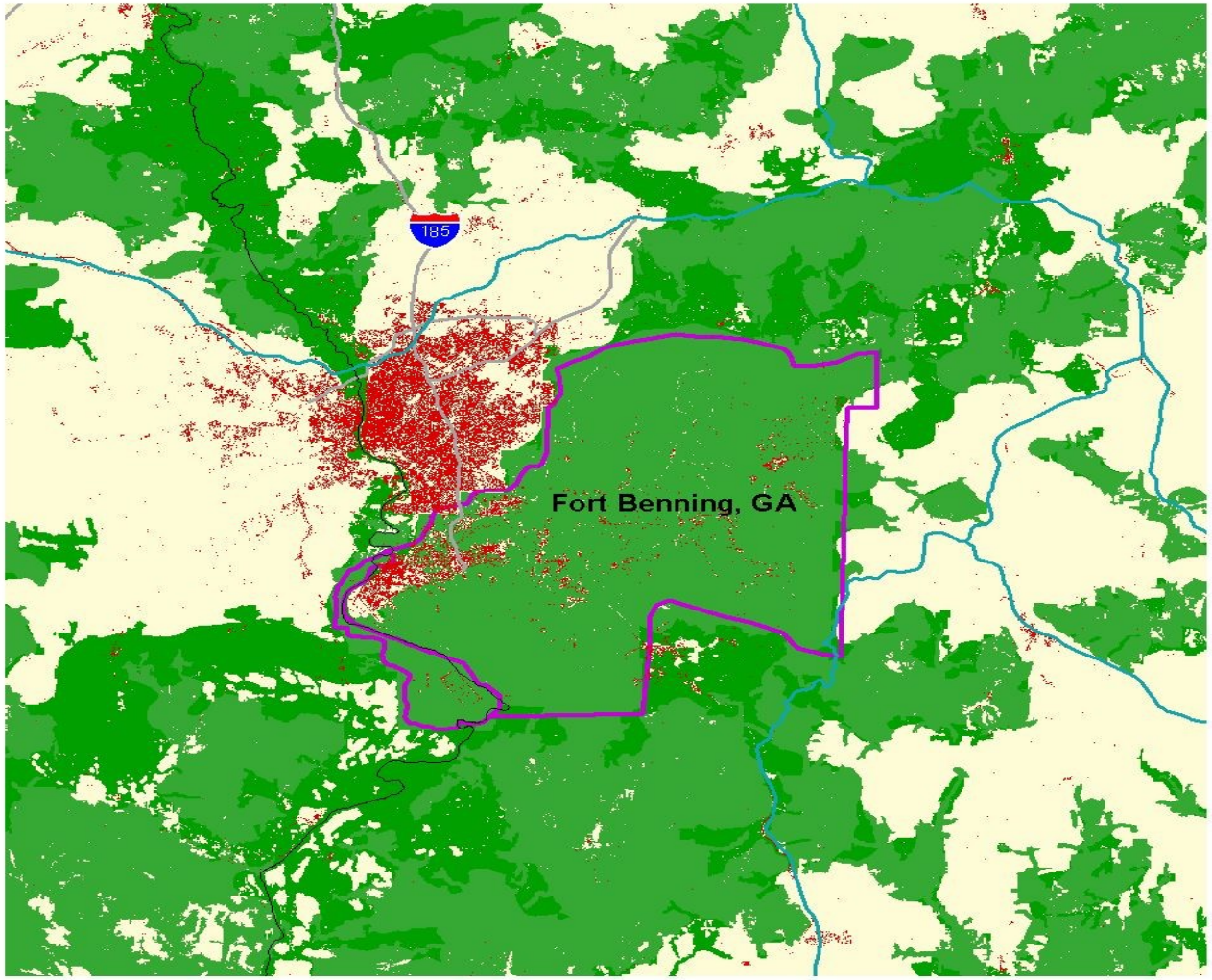
Potential DOD Partners Along the Fall Line Ecoregion and the Southeastern Ecological Framework


Camp Mackall
Fort Bragg
Fort Jackson
Shaw AFB
Fort Gordon
Savannah River Site
Fort Benning
Robins AFB
Fort Rucker
States
DOD Lands
Ecological Regions
Sand Hills/Fall Line
Ecological Framework
EPA does not warrant the accuracy, completeness, or timeliness of the information shown. The information herein is subject to revision and is not in final form. EPA shall not be liable for any detrimental reliance upon the information shown.
This map has met the guidelines for EPA Region 4 peer review process.

Fort Knox, KY and the Southeastern Ecological Framework



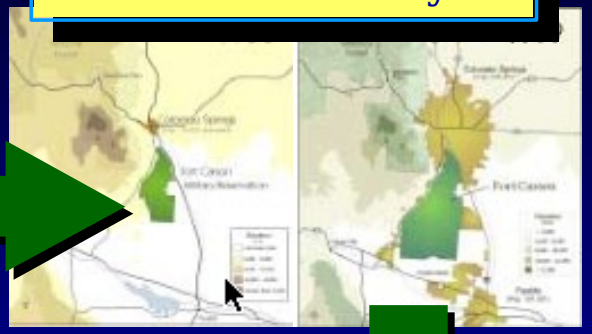
Fort Benning and the Southeastern Ecological Framework



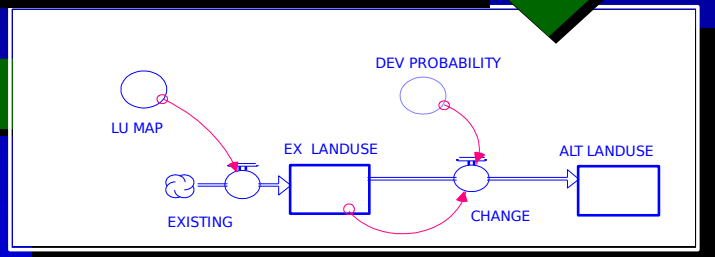
SERM Approach

Assess and compare risks

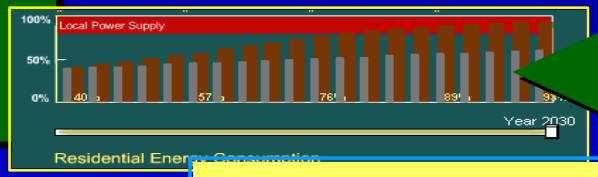
Conduct Trend Analyses



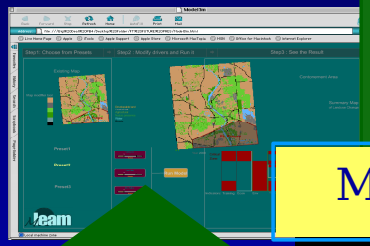
Project Future Changes



Identify Mission Impacts



Mitigate Problems



US Army Corps of Engineers

Engineer Research & Development Center

Performing Partnerships

- **University of Illinois** – LEAM Development, Risk Analysis, Land Evolution Analysis, Regional Economics
- **USGS** – Land Use Land Cover Data, Urban Dynamic Analysis
- **ERDC :EL, CHL, ITL** – Linkages between land changes, watershed dynamics and receiving water conditions, computing.
- **AEC and AFCEE** – Testing and transition of technologies to Service use.
- **AEPI** – Sustainability Policies, Land Availability Strategies, Mitigation Policies.
- **Desert Research Institute** – Community/Installation Futures Analysis, Community Information Delivery
- **Oak Ridge National Lab** - regional habitat and air quality, Benning Analysis
- **Savannah River Ecology Lab** – fall line regional analysis
- **University of Georgia** – GIS data (LULC) for Georgia
- **TRIES** – Urban impacts on stream ecology

SERM Points of Contact

Bill Goran, Jim Westervelt, Elisabeth Jenicek, Suzanne Loechl, and Robert Lozar

Engineering Research and Development Center
Construction Engineering Research Laboratory (CERL)
P.O. Box 9005, Champaign, IL, 61826-9005
Phone 1-800-USA-CERL.

David Eady

Army Environmental Policy Institute (AEPI)
404-524-9364

Web: http://www.cecer.army.mil/KD/SERM

Steps Towards Understanding Land Requirements

- Considerations:

  Land Values

  Future Land Use Changes (and spatial and temporal variability of changes)

  Ownership types and parcel sizes

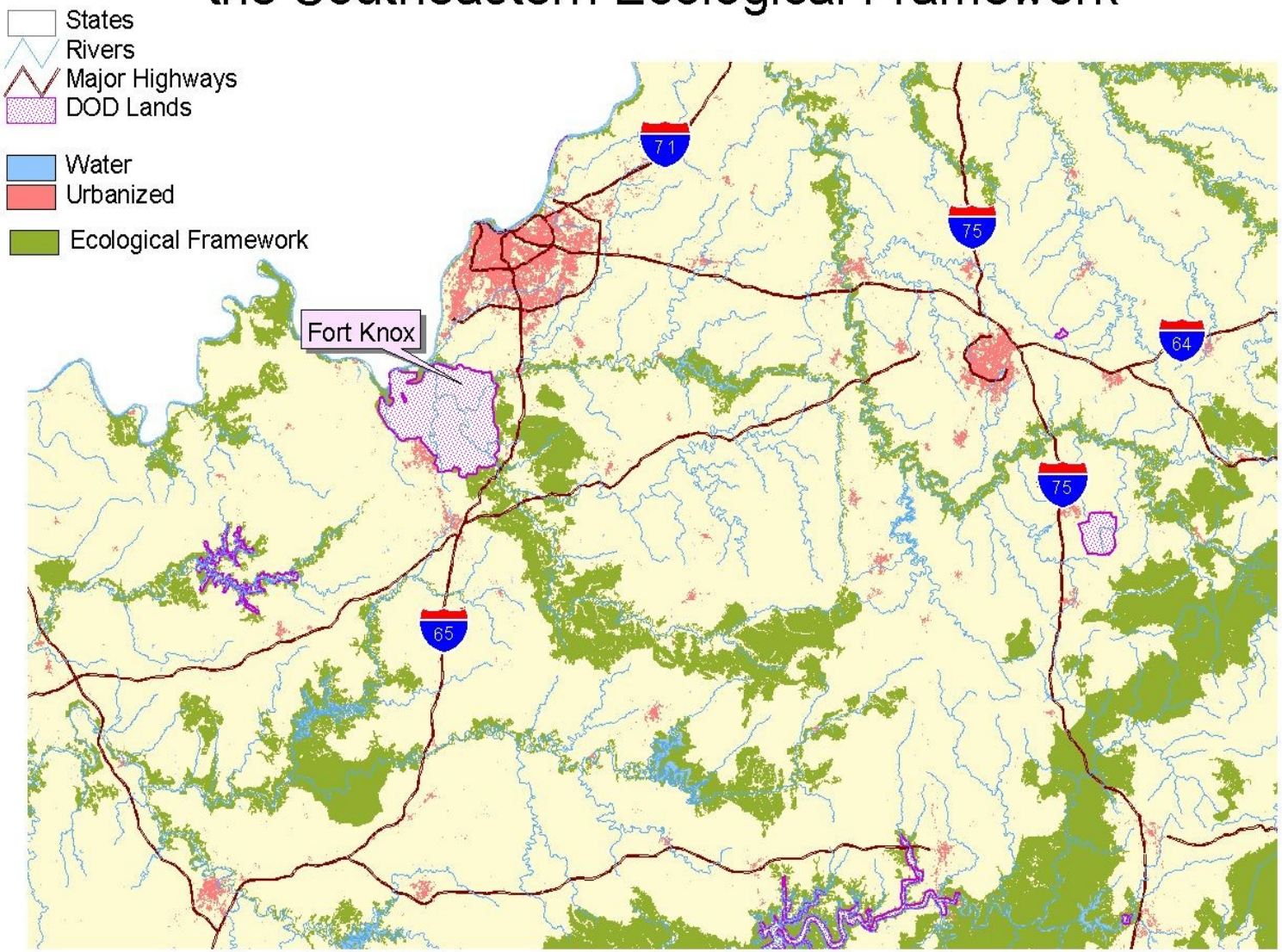
  Property Rights Bundle

  Legal and Regulatory Authorities

  Public Awareness and Attitude

  Stakeholder Involvement and Collaboration Opportunities

Fort Knox, KY and the Southeastern Ecological Framework



US Army Corps of Engineers

Engineer Research & Development Center